UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/507,375	09/21/2004	Kazushige Ohno	259205US90PCT	4117

22850 7590 04/20/2007

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
BOYER, RANDY	
ART UNIT	**PAPER NUMBER**
1764	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/20/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/20/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/507,375	OHNO ET AL.	
	Examiner	Art Unit	
	Randy Boyer	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☒ Claim(s) *7* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 7 is objected to for apparent misspelling in the claim language.

2. With respect to claim 7, the claim reads in relevant part ". . . a substance having a refractive index larger that that of the oxide ceramic, . . .". Examiner assumes that Applicant intended the first "that" to in fact read "than." Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (US 3991254) in view of Iseli (US 4503128) and Clough (US 5326633).

7. With respect to claim 1, Takeuchi discloses a filter for the purification of an exhaust gas provided with a heat insulating ceramic layer (c) surrounding a porous ceramic catalyst (520), wherein the heat insulating ceramic layer is porous and has a thermal conductivity in the range of 0.3 – 0.6 kcal/mH°C (see Takeuchi, column 5, lines 40-45).

Takeuchi does not disclose wherein the porous ceramic carrier has a porosity of 40 – 80 %.

However, Iseli discloses cordierite-based spray coatings which are highly porous, thermally shock resistant, low in thermal conductivity, and provide well-adhered oxides having excellent abradable and erosion resistant properties (see Iseli, column 2, lines 1-10). Iseli explains that such coatings are compatible for use with other ceramics (see Iseli, column 3, lines 18-20), and are particularly useful in high temperature, high

erosivity environments (see Iseli, column 3, lines 36-39). In addition, Iseli notes that the porosity of the coating layer can be controlled by the method of application (see Iseli, column 4, lines 20-34), and that porosity is directly related to thermal conductivity (see Iseli, column 1, lines 44-47). Likewise, Clough discloses the coating of monolithic catalyst substrates used in the catalytic conversion of combustion gases (see Clough, column 18, lines 50-54; column 19, lines 15-28; column 20, lines 44-46, 54-57, and 62-64; and column 21, lines 5-9). Clough explains that the porosity of such substrates, typically in the range of 10% to 65% (see Clough, column 21, lines 45-51), can be controlled. Finally, Clough notes that the thermal conductivity of the monolithic substrate can be reduced in magnitude by up to 90% compared to non-porous supports by optimizing the degree of porosity (see Clough, column 21, lines 59-68).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the filter of Takeuchi to provide for spray-coating of the porous ceramic catalyst with a catalyst coat layer as taught by Iseli, and varying the porosity of the catalyst coat layer (as taught by both Iseli and Clough) so as to provide a porous ceramic carrier having a porosity of 40-80% and a thermal conductivity of 0.3-60 W/mK.

8. With respect to claim 2, both Iseli and Clough disclose the change in porosity to affect thermal conductivity. In addition, Clough discloses the optimization of thermal conductivity by varying porosity (see discussion *supra* at paragraph 5).

9. With respect to claim 3, Iseli discloses a coating layer made, in part, of alumina and silica (see Iseli, column 2, lines 39-42).

10. With respect to claim 4, Iseli discloses wherein the coating layer containing cobalt (see Iseli, column 1, lines 48-54).

11. With respect to claim 5, Iseli discloses wherein the coating layer contains a rare earth oxide (see Iseli, column 2, lines 48-51).

12. With respect to claim 6, Clough discloses wherein the porous ceramic carrier is cordierite (see Clough, column 23, lines 1-8).

13. Claims 7-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi (US 3991254) in view of Iseli (US 4503128) and Clough (US 5326633), and further in view of Lange (US 4166147).

14. With respect to claim 7, Takeuchi discloses a filter for the purification of an exhaust gas provided with a heat insulating ceramic layer (c) surrounding a porous ceramic catalyst (520), wherein the heat insulating ceramic layer is porous and has a thermal conductivity in the range of 0.3 – 0.6 kcal/mH°C (see Takeuchi, column 5, lines 40-45).

Takeuchi does not disclose wherein the porous ceramic carrier has a porosity of 40 – 80 %, or wherein the catalyst coat layer is made of at least one oxide ceramic selected from alumina, titania, zirconia, and silica and contains a substance having a refractive index larger than that of the ceramic oxdide.

However, Iseli discloses cordierite-based spray coatings which are highly porous, thermally shock resistant, low in thermal conductivity, and provide well-adhered oxides having excellent abradable and erosion resistant properties (see Iseli, column 2, lines 1-10). Iseli explains that such coatings are compatible for use with other ceramics (see

Iseli, column 3, lines 18-20), and are particularly useful in high temperature, high erosivity environments (see Iseli, column 3, lines 36-39). In addition, Iseli notes that the porosity of the coating layer can be controlled by the method of application (see Iseli, column 4, lines 20-34), and that porosity is directly related to thermal conductivity (see Iseli, column 1, lines 44-47). Likewise, Clough discloses the coating of monolithic catalyst substrates used in the catalytic conversion of combustion gases (see Clough, column 18, lines 50-54; column 19, lines 15-28; column 20, lines 44-46, 54-57, and 62-64; and column 21, lines 5-9). Clough explains that the porosity of such substrates, typically in the range of 10% to 65% (see Clough, column 21, lines 45-51), can be controlled. Clough notes that the thermal conductivity of the monolithic substrate can be reduced in magnitude by up to 90% compared to non-porous supports by optimizing the degree of porosity (see Clough, column 21, lines 59-68). Finally, Lange discloses the formation of an aqueous mixture or sol of titania which is shaped and fired into solid forms (see Lange, column 1, lines 14-19), and used for filtering applications and as catalyst supports (see Lange, column 10, lines 22-27). Lange explains that the precursor titania mixture is particularly useful for applications requiring high strength and high reflectivity in a high-temperature environment (see Lange, column 1, lines 44-48).

Therefore, it would have been obvious to the person having ordinary skill in the art at the time the invention was made to modify the filter of Takeuchi to provide for spray-coating of the porous ceramic catalyst with the titania sol of Lange as taught by Iseli, and varying the porosity of the catalyst coat layer (as taught by both Iseli and Clough) so as to provide a porous ceramic carrier having a porosity of 40-80%, a

thermal conductivity of 0.3-60 W/mK, and containing a substance having a refractive index greater than that of the oxide ceramic.

15. With respect to claims 8, 9, 11, 12, and 14, Lange discloses a titania sol with iron oxide as a pigment to form a refractory body (see Lange, column 3, lines 11-20 and 25-31), wherein the refractory turns black in color upon reduction in a hydrogen environment (see Lange, column 3, lines 25-31).

16. With respect to claim 10, Lange discloses wherein the shaped and fired refractory is in the form of rutile titanium dioxide (see Lange, column 6, lines 4-31). Rutile titanium dioxide is known in the art to have a peak in a portion that a reflectance against an electromagnetic wave of not less than 10 μm is not less than 70% (see e.g., Sakashita (JP 06239656 A), English machine translation at page 5, paragraph [0008]).

17. With respect to claim 13, Clough discloses wherein the porous ceramic carrier is cordierite (see Clough, column 23, lines 1-8).

18. With respect to claim 15, Iseli discloses wherein the coating layer contains a rare earth oxide (see Iseli, column 2, lines 48-51).

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Randy Boyer whose telephone number is (571) 272-7113. The examiner can normally be reached Monday through Friday from 8:00 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola, can be reached at (571) 272-1444. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RPB

Glenn Caldarola
Supervisory Patent Examiner
Technology Center 1700

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :17 December 2004, 9 March 2005, 3 April 2006, and 21 September 2006.